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PROGRESS REPORT OUTLINING WORK  
ON  
CONTRACT Nonr-248(37) - NR 083-038/7-28-52  
FOR  
PERIOD ENDING 30 OCTOBER 1953

Research Contract Directors

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4 November 1953

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for  
Period Ending 30 October 1953

Contractor: The Institute for Cooperative  
Research  
of  
The Johns Hopkins University  
Baltimore, Maryland

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ESTUARINE CURRENT METER CONTRACT

PROGRESS REPORT

FOR

PERIOD ENDING 30 OCTOBER 1953

Since the last report a framework has been designed and built to support all of the equipment associated with the anchor for the cantilever-type current meter. This equipment involves the camera display, bridge box, servo balance system, and the servo amplifier.

The camera display will eventually include the magnetic compass repeater, the balance indicator, and an eight-day clock. All but the last of these items are on hand and mounted on the framework.

The bridge box is an aluminum housing containing the critical elements of the strain-detecting bridge such as, the balance potentiometer, stable bridge resistors, and balance adjustment potentiometer. The purpose of this box is to provide protection and shielding for the bridge elements. The box has been assembled and mounted.

The servo balance system includes the gearing required to couple the servo-motor, the balance potentiometer, and the revolution counter used as a balance indicator. These items, including the amplifier, have been procured and mounted.

An inverter has been procured to provide 115 volts A-C power from the 24-volt batteries.

Except for the above mentioned items, the effort since the last report has been directed toward completion of the ultrasonic current meter.

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A new design has been made for the ultrasonic transducer "head". This was necessary to permit easier installation of crystals and cables, and to reduce the hydraulic drag of the head. The new head has been fabricated and assembled, and will soon be pressure tested.

The anchor equipment for the ultrasonic instrument is being built. This equipment includes the power supply, camera display, batteries, programmer, compass repeater, and indicating meter.

The power supply has been built and mounted on the anchor frame. It consists of a small N-G set and a regulator. The N-G set is driven by the 24-volt batteries, and delivers 70 milliamperes at 150 to 180 volts (D-C) to the regulator chassis. This regulator is electronic, and it provides B+ power to the ultrasonic chassis that is stable at 150 volts  $\pm$  0.7 volt over the range of battery voltage from 20 to 26 volts.

The camera display in this case will be the magnetic compass repeater, the indicating meter, the commutator indicator light, and an eight-day clock. The compass repeater is the same one used in the cantilever instrument camera display, and has been mounted on the anchor frame. A 250-degree, 1-milliampere, 3-1/2 inch diameter direct current meter with a 1% accuracy has been ordered for the indicating meter, and will soon be available. The commutator indicator light will be visible to the camera

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so that the direction of transmission of the ultrasonic path will be known on each frame of camera data. The clock is yet to be procured.

The batteries will be ordered as soon as consideration can be given to the problem of elimination of the gas given off during discharging. The 24-volt battery will have a rated capacity of 25 ampere-hours. This is about two times larger than that required for operation of the instrument for one week.

The programmer consists of two timer motors and a number of relays for the initiation of the reading sequence. Provisions have been made for "test reading cycles". A push-button bypasses the switch on the main timer and starts the sequence. Subsequent operation of the secondary timer contacts and the relays is indicated by dial lights. This makes it possible to check the fuses, manual switch positions, etc., before the instrument is located at a reading station. The main timer will provide one switch closure for 30 seconds every half hour. This switch then starts the secondary (or program) timer which is arranged to keep itself going for one minute, at the end of which time power is removed from everything, and the secondary timer stops. The main timer runs continuously. The timers have been ordered, and are to be shipped within a week or two. The programmer is essentially complete, with the exception of the timers.

The camera and an appropriate lens have been selected, and will

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be procured shortly. The dimensions of the anchor housing have been decided, and an order will be placed as soon as the battery problem is solved.